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THE MEANING FOR HUMANITY OF THE AERIAL CROSSING OF THE OCEAN

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THE recent great achievements of the American and British aircrafts show in a striking manner that we are on the eve of the establishment of regular transoceanic aerial voyages. How many centuries, first of audacious dreams, afterwards of daring efforts, were necessary, before this magnificent and powerful realization!

Transoceanic aerial flight is such a powerful factor in humanity's progress and evolution that I fear the language used to-day by human beings is scarcely adequate to describe the magnificent destiny it will produce. This is why I ask indulgence for the audacity of this attempt to analyze the significance of this majestic achievement.

In the aurora of the centuries taken for the blossoming of humanity on our sorrowful planet, the evolution of man started very slowly. Left to himself, with only his physical forces to lead him towards an unknown destiny, of whose greatness, however, he had an unconscious feeling, man would have succumbed under the superiority of innumerable adversaries and adversities, if it had not been for the gleam of consciousness that was smouldering within him. It is the omnipotence of this consciousness that has subdued the universe to man and has made him its uncontested master. It is this consciousness that caused the majestic process of biological evolution to take a new form. The adaptation of the species to outside conditions was transformed into the adaptation of outside conditions to the species, and it is this modification of the biological path that marks the origin of humanity.

The first steps were exceedingly slow and laborious. The first conquests of prehistoric civilization stretch over an immensity of time. But the different halting-places of history are marked by a rate of progress more and more accelerated. It is sufficient to open our eyes simply on our modern world to be amazed by the rapid march of civilization. If, now, through all past time, up to our present days, we contemplate this rapidly

accelerating rate of progress, one primordial factor will appear, which is the soul itself of this accelerated ascent towards a destiny more and more luminous. It is the intensification of the relations between men established by ways of communication.

As soon as the sedentary state of peoples began to succeed the nomad state, the necessity of routes and their enormous utility were instinctively felt; and animal locomotion, whose origin disappears in the night of time, brought even in antiquity the art of route building to a high degree of perfection. The great civilizations of the ancient world were already celebrated for their marvelous roads and maritime routes. Babylonia, Carthage, Greece and the Roman Empire developed majestic routes which excite our admiration; and the traces of some of them still remain. In the civilizations that followed these epochs, in the Middle Ages and the Renaissance, it is easy to note that the march of progress is intimately connected with the development of ways of communication. This fact is generally expressed in speaking of the influence of voyages, of the relations between peoples and the discoveries of new ways and routes. The influence of the technical perfection of the ways of communication is to be seen in a particularly striking manner in the century of steam, marked by such a distinctly powerful progress.

It is impossible to note in a short sketch all the ways in which methods of communication influenced the evolution of humanity. An enormous work could be written on this subject. The essential facts are that almost all human activity on our planet consists in "displacement," and the more easily this displacement is made the more the life of man is extended, and the more powerful it becomes. Our life is built up from motion; to open new routes is to hasten and strengthen its development.

One great factor dominates the whole problem of ways of communication. It is "speed." It is not sufficient to have routes running in all directions and covering great distances; it is all-important for the actual motion to be as rapid as possible. The great influence of speed in the social organization of human activity is not always recognized sufficiently. For example, one can mention the fact that Napoleon in the last years of his power expressed some doubts as to the value of Stephenson's railroads. We must not be astonished if the entire extent of the influence of the speed factor is not realized by all, probably because it is too vast in its majesty and power. But some of us have within ourselves a feeling, more powerful than the conscious reason, which instinctively tells us what speed is. Do you know what speed intoxication is? Happy are those who can

feel it without having to understand it. It is the powerful voice of the innate forces of progress speaking in them. It is the intuition of the future all-inclusive power of humanity, of which, as an echo of destiny, they have the sweet enjoyment. Do you remember the glorious Greek warrior who immolated himself to the speed god, bringing to his fellow-citizens the great news of the Marathon victory, so that their knowledge of social security might be hastened, even by only a few moments? This hero of antiquity, by a striking act, has made immortal his veneration for speed. Great men and great peoples have always paid a worthy tribute to speed. A beautiful example is given by the development of the United States, where the social importance of the speed factor has been understood from the origin of the country, a country which, in the hands of an energetic and intrepid people, has been brought to that powerful and majestic state which we can but admire.

Speed of transportation means acceleration of activity, increase of the people's efficiency, and, as a result, economy of time, with all its enormous consequences. Saving of time brings leisure for meditation and personal improvement, which are the original sources of all progress.

Speed of transportation means also increase of human life-time, which always was and is one of the most burning desires of man, and hence one of his greatest felicities. To live means to act, to feel and perceive. It is the amount of the perceptions lived that marks the duration of a life-time more than the number of years elapsed. It is not given to us to increase the duration of our lives, but it depends upon us to use our lives better and to fill them with more sensations. I am prepared to assert that the life of a modern man is effectively longer than the life of a man of antiquity, although of the same duration. We have now more to live through, although we live no longer. Our gathering of sensations is much ampler and much more diversified, and they emanate from a much wider horizon. Peter the Great, that powerful reformer of Russia, has expressed this deeply philosophical idea by the significant words: "Waste of time is death-like."

Ask the scientist whether he considers the universe as eternal or doomed to an indubitable end, and you will hear him say that over the entire universe the sinister shadow of the omnipotence of entropy is hovering, and demands an absolute end by a complete thermic uniformization. If, now, not only our personal life, but the course of all humanity is limited, let us at least make the best use of the time left to us. Speed is

our most powerful ally. Let us use it, develop it, and venerate it. It is in infatuation with it that is found the most powerful source of happiness.

Another important rôle is also inherent to the speed factor. One of the great consequences of the establishment of ways of communication is to bring men and peoples to know one another better and consequently to understand each other better and to unite their efforts in the great march of social evolution. The greater the intensification of relations between peoples, the more rapid is the speed of what can be called the uniformization of humanity. In past times, geographical obstacles separated men into different groups called peoples. The conditions under which the lives of different peoples were taking place were unlike, and, although all associations of men, by their nature, progress in the same direction, it is with such dissimilar psychological physiognomies, that, when these different peoples in the process of their evolution were brought together, they could only fight one another to death, each considering the other as his worst enemy. Men did not recognize man in men. But the evolution of man progressing, and distances being conquered by ways of communication, the uniformization of humanity was growing. It is first the uniformization of social customs and material living conditions that is established. Afterwards the uniformization of morality and psychology begins to appear. It is self-evident that social uniformization does not at all bring with it the uniformization of individuals, whose personality is fixed by the qualities and talents given to each man by nature. The great wrong of the Bolsheviki doctrine¹ is that it has completely overlooked the difference between social uniformization and individual uniformization. Regardless of what men will think or do, the whole of humanity will tend towards social uniformization, but individual uniformization is and always will be a tendency contrary to the nature of things and progress. That is why, regardless of the development it may reach, Bolshevism is doomed to failure or complete reformation. I will not dwell here on the question of how social organization has to be conceived in agreement with the principle of social uniformization; this would carry us too far from our main subject. Now this fundamental process of social uniformization is far from being accomplished on our planet. But I would like to believe that the Great War, from

¹ The author of this paper has lived for six months under Bolsheviki rule and is well acquainted with Bolsheviki doctrine and its practical realization.

which we are still bleeding, marks one of its last halting-places. The World's Peace, the universal social union, will only then be able to reign in all its luminous beauty when the process of social uniformization shall have reached a certain stage of development. The most powerful stimulant to universal social uniformization is above all the closeness of international relations. The more rapid are the means of communication, the more will all peoples be, so to speak, neighbors to one another, the more will they jostle one another and be able to know and appreciate each other, and the great universal human family will rise the more rapidly. The century of steam and electricity has already brought the universe to such a state of development that we see on the horizon the dawn of a universal league, somewhat rachitic, but let us hope still a league of nations. It is a wonderful thought indeed, in our epoch of sharp hate and underhanded revenge, to see the great country of America, in a magnanimous glow in advance of the men and the times, claiming with its powerful voice the union of people in the League of Nations. Universal harmony is the highest ideal of every man conscious of his destiny. Let us help those who have not until now reached the social height necessary to step over the marvelous threshold of the future kingdom of mutual agreement and friendship.

The life of man goes on surrounded by three "elements": earth, water and air. Each of these may be used as a way of communication.

On the earth we must trace our routes, and when these are once established we must always follow them. Terrestrial routes have passed through different well-known stages of development and have now reached a high degree of perfection, in the sense of speed as well as in weight of material transported. But whatever improvements may be realized in terrestrial routes, the fact will always remain that the roads have to be built, and when built they remain limited to their original itinerary, and unite only different parts of the same continent.

Water ways have the advantage over land ones of being furnished by nature; and in the immensity of the seas and oceans ships and boats are free to follow all directions. But the hatreds between men, even here, have created insuperable hindrances; some think, for the advantage of the one and the harm of the other, but in reality for the disaster of all humanity. Moreover, water ways unite only different parts of different continents, or, by rivers, give only a limited access within the continents.

The conquest of the air, the marvelous realization of the end of the twentieth century, has finally given us the aerial way of communication, the first to be universal. Air routes have absolute advantage over earth and sea routes, for instance, in the attainment of greater speed, and the possibility of travel at different altitudes. This last factor can never be overestimated, on account of the new features it introduces. At least there has been acquired by it the possibility of looking on our planet from a higher standpoint, and many consequences of great importance will follow from this bird's vision given to man's brains. It has been during long centuries the dream of humanity to fly over seas and lands, to travel through space in rapid flight, following only the will of fancy. But, the first enthusiasm past, when airplanes and airships began to fly, their range appeared to be less than the expectations of the dreamers. Aircraft could fly over earth and seas, but the oceans still remained obstacles to them. And although we felt the possibility of flight over the ocean, we were unable to realize it. The universality of the air routes still remained unrealized. But the scientific and technical workers and investigators by their indefatigable efforts have brought aircraft to such a degree of perfection that finally the immensity of the ocean has been overcome. From this moment on, aircraft has become really the first universal way of communication. I can not refrain from mentioning here some of the glorious names of those men to whom humanity owes the great technical development of aviation.

It was probably the British mathematician Cayley who had the first vision of the airplane (1809). It was the French mathematician Penaud who reached such an understanding of aerodynamical sustentation that he was able to build the first airplane model that actually flew (1872). But it was the German engineer Lillienthal who first reached the wonderful result of making the air really lift him, as he demonstrated in a brilliant series of gliding flights (1891). It was Langley and Chanute who, by remarkable experiments, strengthened the principles established by Lillienthal. And finally, it was the brothers Wright who succeeded in taking the decisive step and realized that marvelous thing, the airplane (1903). In the European countries it is to the powerful personality of Ferber that we owe the development of aviation. In a remarkable book² left by this scientist and gallant prophet of aviation we

² F. Ferber, "L'Aviation, ses debuts, son développement," Paris, 1908, published by Berger-Levrault.

read his forecast: "From hill to hill, from town to town, from continent to continent." It is the realization of these beautiful words that we have now reached.

We thus find ourselves now on the eve of the establishment of great universal aerial voyages, transoceanic as well as trans-continental; and with them, by the power of the intensification of the relations between peoples, we will progress towards universal harmony, and approach, in spite of obstacles, a luminous destiny at a rate of progress unknown before.

Let all who still doubt the all-powerful influence of universal air routes think only a little of your daily activity, and you can not help being enthusiastic about all the new and wonderful possibilities that the development of air navigation will give you. Whoever you are, air navigation will load you with its powerful benefits. If you are a business man or merchant, one of those who have appreciated better than others the speed factor, think for a minute that you will have the neighboring continents at a day's distance from you. Your associates from other continents will be able to join you in twenty-four hours. The samples that you may need will be delivered to you on your request in the same length of time. You will be able to travel over enormous distances at tremendous speeds, and scrutinize enormous spaces by your spirit of enterprise. If you are an engineer, scientist or investigator, you will be able to get the necessary book, apparatus or information from any other part of the world in a time less than previously required to get the same from the same province. Think a little, you leaders of human activity, of all the wonderful possibilities that will follow from the new aerial universal ultra-rapid routes, and your keen minds will not need to be convinced of the miraculous activity of future destiny. And all you other less active members of human society, in addition to the comfort, speed, and security of the air routes, you will see flowing around, as from a cornucopia, the products of welfare created by the active members. But all these results just described are small details in comparison with the new human psychology which will progressively result from this era of activity at a rate unknown before, and which without any doubt will reveal to the future the superman of spirit, soul and beauty.

The crossing of the ocean by the airplane makes aircraft the first universal means of transportation, and by this fact alone opens a new era of civilization, with such an increased rate of progress that it is almost impossible for the human mind of to-day to appreciate its whole significance. Acceleration of

human activity will increase the world's welfare; and at the same time the resulting economy of time and individual liberty will lead to the perfecting of the human race in a deep and increasing feeling of happiness, the result of the intensification and multiplicity of sensations, this whole wonderful process of progressive evolution being crowned by the spirit of universal harmony. Aircraft, having become by the crossing of the ocean the universal means of transportation, thus appear as one of the most sublime conquests of civilization, by whose luminous destiny our poor imaginations can only be dazzled.

But this wonderful destiny, which we now foresee, whose rising has begun and the means of reaching which we have already in hand, will require a certain time for its blossoming. Such delay in the realization of one of the most beautiful conquests of humanity is a consequence of what, with much indulgence, is called social inertia. I do not wish to enter into the details and the analysis of this complex phenomenon, and will mention only one of its most painful sides. I apologize for stating the fact so directly. I am guided only by the desire to bring in this way a more intensive feeling of what I intend to say. Why do you, humanity, let yourself be governed by the most ignorant among your fellow-creatures? I will explain myself plainly. At the present time the social power, to a crushing degree, is in the hands of what may be called the "classical humanists." Who are they? Independent of their literary, juristical or other specialty, their mentality once cleared from the sophistical fog with which they are so clever in surrounding themselves; with their official logic, which is nothing else than a brilliant example of reasoning to be used when truth has to be avoided, we see them appearing only as experts in the dismal art of knowing the degree of decay which human nature can reach. It is exactly the contrary of what we need the most, that is, to know what is the degree of perfection that humanity can reach. The ethics of the classical humanist developed under such conditions is not in line with sufficiently powerful and valuable ideals. This is why their political activity provokes so often such social disaster. But to-day we are standing on the eve of a marvelous new era. Among the seekers for truth, among the scientists, engineers, and experts in different technical arts, a new ethics has grown, animated by the most powerful and magnanimous sentiments of justice and universal benevolence, to which they have been brought by the contemplation and study of nature. It is upon the ethics of the men who have an exact knowledge of these con-

crete facts that depends the welfare of humanity. It is by these competent and best men of humanity, masters of the physical world, that the people ought to let themselves be led. The fight between the two tendencies has already begun. It is the fight between the ethics of scholastic ignorance and the ethics of scientific verity. This fight is an old one, but has taken in modern times a new form. It is to Dr. George Sarton, professor of Harvard University, that we owe a brilliant, vigorous and rigorous exposé of this social state of things, which he designates by a name full of destiny, "The New Humanism."⁸ Any eloquence of mine would disappear before the words of full conviction of this defender of one of the most beautiful social movements, the understanding of which will without any doubt make us avoid many disasters of the future. Workers in science and technical arts, you have the duty of uniting about the powerful ideals of the "New Humanism," and it will not be long till the light of welfare will pierce the darkness of the classical humanist. The fate of humanity is in progress; this is why the victory of the "New Humanism" can not be stopped. But let us reach it by the peaceful way of conscious evolution, and not by the way of bloody revolution, whose specter stands ready to spread itself over the earth's surface. Modern humanity has a long step to make; it is that of emancipation from the prejudice of the classical humanist. Let us take this step heroically, having the courage to recognize our errors without persisting in our mistakes, without concealing by the sophistries of the classical humanists the actual social wounds, and without crushing by ignorance the benefits of science.

To see how far science is from being sufficiently appreciated to-day, it is enough to compare in the budget of any state the appropriation for science and the appropriations for criminality, for example, this last word being understood in its widest sense. The comparison is illuminating. I will not insist on this painful side of modern social life.

I have considered it necessary to mention here the "New Humanism" for the purpose of showing that the evolution of humanity, although bound up with technical conquests, depends, for the rapidity of its progress, also in a large measure upon social morality. The one brings the other with it.

I allow myself to express the intense desire to see the universe conquered by the "New Humanism," spreading through

⁸ George Sarton's "Le Nouvel Humanisme," *Scientia*, March, 1918; see also THE SCIENTIFIC MONTHLY, September, 1918, "The Teaching of the History of Science."

the earth by the powerful transcontinental and transoceanic air routes; and then it will not be long before universal peace, so longed for by every one, becomes a natural phenomenon.

Since the origin of the universe, the complete conquest of the air, now realized by the crossing of the ocean, is the most important factor ever reached in the evolution of humanity.

The history of all mankind is merely the history of its fight against slavery by the forces of nature. Science is our powerful liberator; it teaches us how to use these forces for our own benefit. How many billions of mechanical horsepower are already working for us! To them we owe all the beauty of modern civilization. Workers in technical arts and sciences, you must be firm in your convictions, in the face of social ignorance; your efforts are tracing the path of man's highest destiny.⁴

⁴ It is a special pleasure for the author to address his heartiest thanks to Dr. J. S. Ames for the help he gave him in correcting the style of this article.